Building Capacity to Integrate NASA Earth Science into Environmental Management in The Context of a Changing Climate

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The NASA Applied Remote Sensing Training Program conducts professional trainings in the application of Earth Science data for air quality, water resources and disaster management. The goal of the program is to build the skills to integrate NASA Earth Science into agencies' decision-making activities. The program works directly with agencies and policy makers to develop hands-on and online courses that teach end-users how to access, visualize and ***apply*** NASA Earth Science Data in their professional area.

NASA's Applied Remote Sensing Training Program (ARSET)

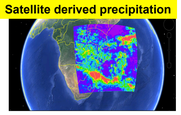
GOAL

Increase utilization of NASA observational and model data for decision-support.

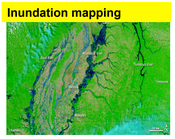
Water Resources and Flooding

- April 2011 – present
- 6 Trainings
- +300 end-users
- Flood/Drought monitoring
- Severe weather and precipitation
- Watershed management
- Climate impacts on water resources
- Snow/ice monitoring
- Evapotranspiration (ET), ground water, soil moisture, and runoff.

Satellite derived precipitation



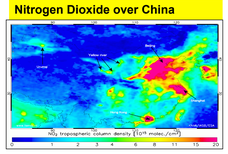
Inundation mapping



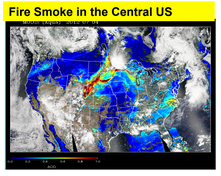
Health (Air Quality)

- 2008 – present
- 26 Trainings
- +700 end-users
- Analysis of dust, fires and urban air pollution.
- Long range transport of pollutants
- Satellite and regional air quality model inter-comparisons.
- Support for air quality forecasting and exceptional event analysis

Nitrogen Dioxide over China



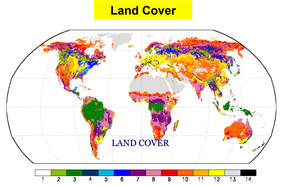
Fire Smoke in the Central US



Land Use/Change and Ecology

- **Beginning in 2014**
- **Webinars and in-person courses**
- **Topics to be informed by ongoing end-user needs assessment**
- **GIS applications**
- **Land use/change and vegetation indices**
- **Fire products**

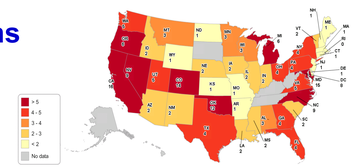
Land Cover



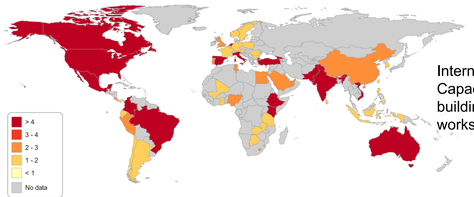
ARSET: Increasing the Use of NASA Remote Sensing Data: Webinars and in-person Hands-on workshops

Program Partners: 1000+ end-users and 350+ organizations

- **Public Sector:** U.S. EPA, USDA, BLM, NOAA, regional, state, county agencies, Tribal Nations, water resources managers, watershed and reservoir managers.
- **Private Sector:** Industry, agricultural sector, NGOs



Number of participating organizations per state (US) or country



International Capacity building/ workshops

Workshop Development Approach

- **Get to know the audience:** area of application interest and level of technical expertise
- **Work closely with host institution**
- **Adapt or develop training modules and Case Studies** to suit participants needs

Basic in person course
- For individuals and institutions new to remote sensing

Online courses
- Provide background material in preparation for in person trainings
- Advanced online courses on special topics

Advanced in person course
- Focused on a specific application/problem: for example impact of snow melt in California on stream flow
- Requires basic online or in person course

Project Outcomes

NASA ARSET training activities have reached many decision-makers world wide and are helping to increase the value of NASA data for environmental applications

- Positive reviews from post-training surveys
- **Dramatic increase in demand for trainings since program inception**
- Increase in number of end-users trained per year since 2008
- Students Becoming Teachers as trainers
- Program Evaluation underway: ongoing end-user feedback for needs and impact assessment has been critical to program success

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Improving Decision Support: Remote sensing Webinars for Water Resources Management

5-week webinar, 1 hour per week
October 17th – November 14th, 2013

Over 197 individuals from 120 organizations and 25 countries

End-user feedback

- ✓ NASA web-tools for water resources management taught in the course were rated as moderately to very useful by all participants, and about a third were interested in more live demonstrations, including GIS.
- ✓ Most participants indicated a strong interest in additional ARSET webinars or in-person instruction.

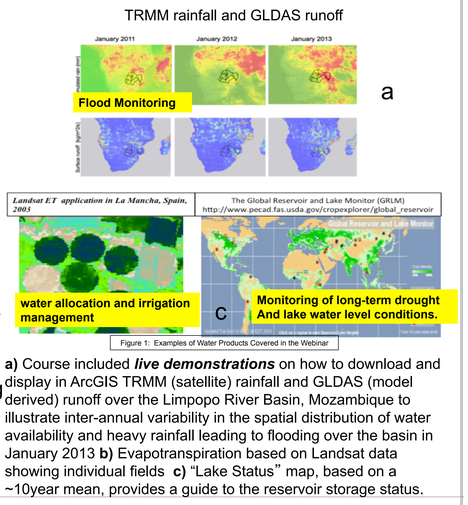


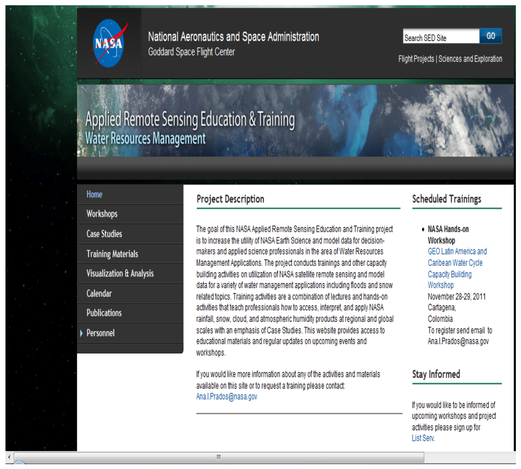
Figure 1: Examples of Water Products Covered in the Webinar

a) Course included ***live demonstrations*** on how to download and display in ArcGIS TRMM (satellite) rainfall and GLDAS (model derived) runoff over the Limpopo River Basin, Mozambique to illustrate inter-annual variability in the spatial distribution of water availability and heavy rainfall leading to flooding over the basin in January 2013 **b)** Evapotranspiration based on Landsat data showing individual fields **c)** "Lake Status" map, based on a ~10year mean, provides a guide to the reservoir storage status.

Public Access to ARSET Training Modules and Other Information

http://water.gsfc.nasa.gov

http://airquality.gsfc.nasa.gov



Publicly available Workshop Modules in English and Spanish

Regular updates on upcoming workshops

Data Product Tables

Links to most popular NASA web tools for decision support

For updates and notification of upcoming workshops sign up for the project listserv:

Water Resources/Disasters
https://lists.nasa.gov/mailman/listinfo/nasa-water-training
Air Quality
https://lists.nasa.gov/mailman/listinfo/arset